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Title : Growth rate and shedding of vibrissae in the grey seal, *Halichoerus grypus*: a cautionary note for stable isotope diet analysis

Category : Ecology

Student : Not Applicable

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Abstract : The analysis of stable isotopes is based on the concept that the ratio of Nitrogen-14 to ^{15}N (or Carbon-12 to ^{13}C) in the tissues of animals is directly related to the ratio found in their diet. Vibrissae differ from the more commonly used muscle and blood samples because the new isotopes are added sequentially and permanently as the vibrissa grows. Thus, vibrissae provide a time series of stable isotope data along the shaft. Previous studies have generally assumed constant growth, but there have been few tests of this assumption. Here we examine the growth rate of 283 muzzle vibrissae of grey seals, *Halichoerus grypus*, over a five-month period to assess the applicability of using stable isotope ratios to infer diet during a time period. A total of 1950 length measurements were taken and growth rates were calculated over the interval. The median growth rate of 0.04 cm/d (range = 0-0.78 cm/d, $n = 1040$), was similar to other studies. However, the distribution was strongly skewed, with two-thirds of the data falling at or near zero growth. Length vs. time plots indicated that the vibrissae did not grow at a constant rate, but instead showed periods of rapid and slow growth. Significant variation in growth rate due to muzzle location was observed, with vibrissae at the far outer/lower margins of the muzzle showing the most rapid mean growth. In addition, vibrissae were not shed synchronously, and there was no seasonal trend in growth rate. The observed patterns of discontinuous and asynchronous growth have serious implications for researchers attempting to extrapolate the time course of diet data. These findings suggest that it will be a challenge to accurately identify the dates when the isotopes were incorporated into the tissue and timestamp the diet data accordingly.